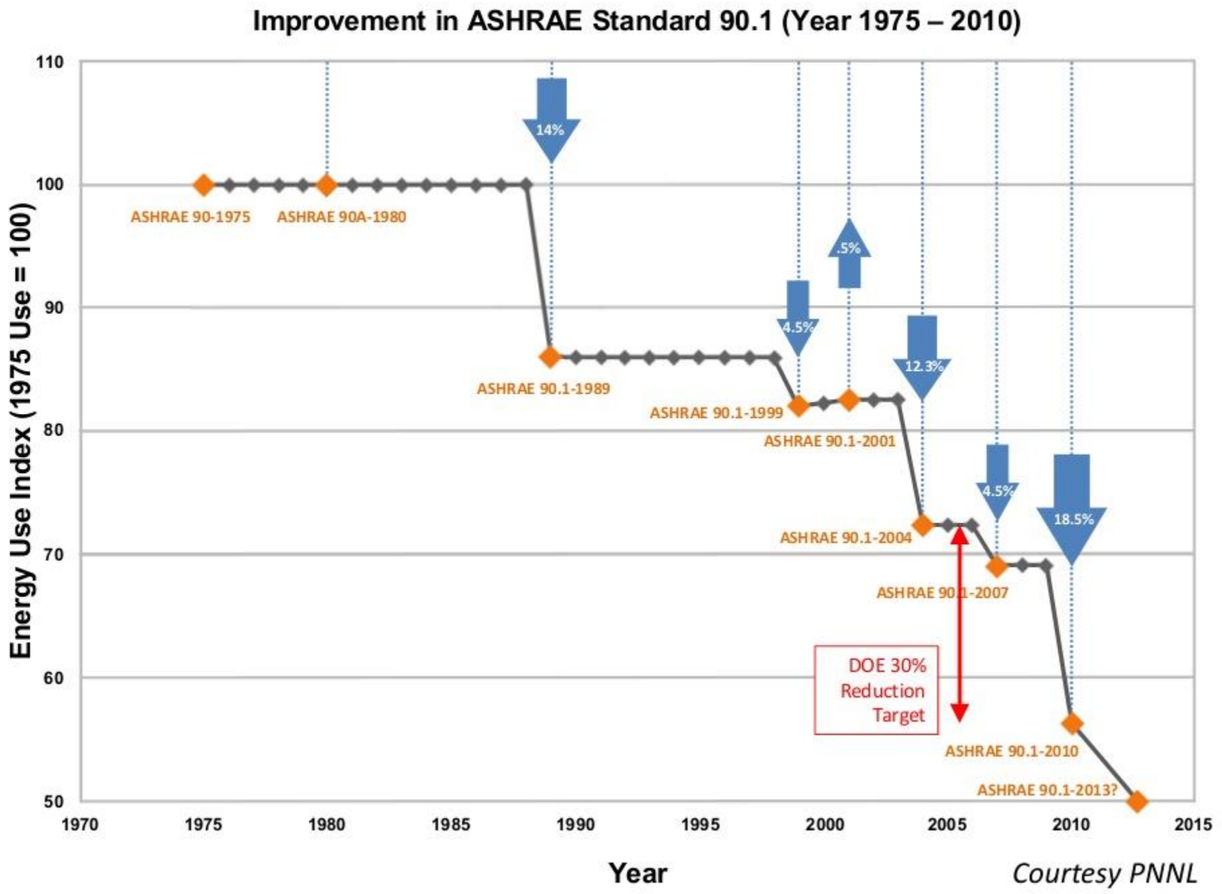
ASHRAE 90.1 – Electrical Updates 2004 - 2010

Isaac Fedyniak

Main Areas of Concern for Education

1. Power Controls (Chapter 8)
2. Lighting General Scope (Chapter 9)
3. Mandatory Control Provisions (Subsection 9.4)
4. Daylighting Control (Subsection 9.4.1.4)
5. Exterior Control (Subsection 9.4.1.7)
6. Functional Commissioning (Subsection 9.4.4)
7. LPD Allowances (Subsection 9.5)

ASHRAE Energy Roadmap



Chapter 8 Power – All New/Alterations/Additions

Low Voltage Dry-Type Transformers (Section 8.1)

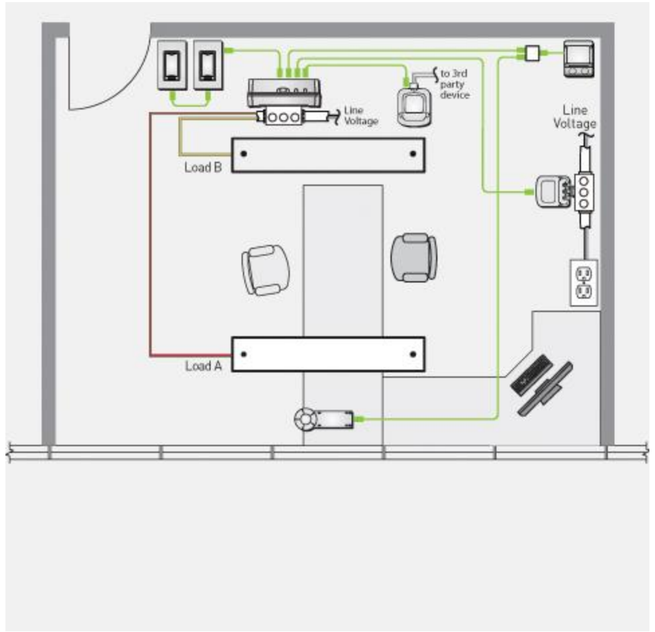
1. Table 8.1 Compliance or NEMA TP1

TABLE 8.1 Minimum Nominal Efficiency Levels for NEMA Class I Low-Voltage Dry-Type Distribution Transformers[a]

Single-Phase Transformers		Three-Phase Transformers	
kVA[b]	Efficiency,%[c]	kVA[b]	Efficiency,%[c]
15	97.7	15	97.0
25	98.0	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98.0
75	98.5	112.5	98.2
100	98.6	150	98.3
167	98.7	225	98.5
250	98.8	300	98.6
333	98.9	500	98.7
		750	98.8
		1000	98.9

[a] A low voltage distribution *transformer* is a *transformer* that is air-cooled, does not use oil as a coolant, has an input voltage ≤ 600 Volts, and is rated for operation at a frequency of 60 Hz.
[b] kilovolt-ampere rating.
[c] Nominal efficiencies shall be established in accordance with the NEMA TP-1 2002 test procedure for low voltage *dry-type transformers*. Class I Low Voltage Dry-Type is a National Electrical Manufacturers Association (NEMA) design class designation.

Chapter 8 Power – All New/Alterations/Additions

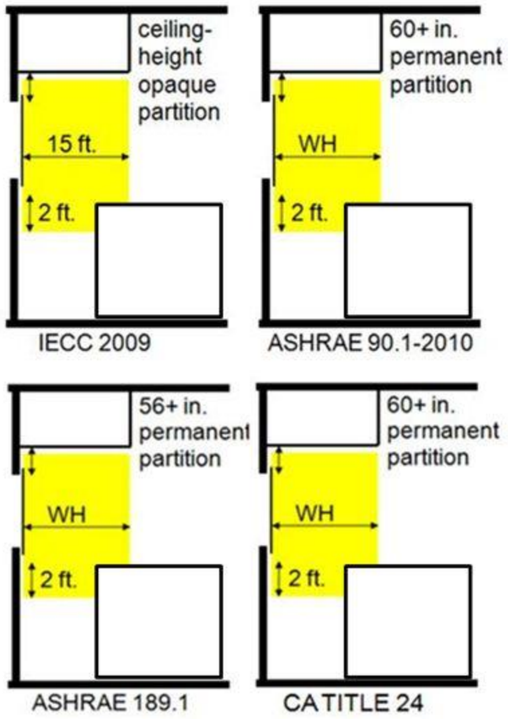


Automatic Receptacle Control

1. 50% of 15A/20A Receptacles located in Private Offices/Open Offices/Computer Classrooms

2. Means and Methods:
    1. TOD Control panel can be utilized for areas no more than 25,000 sqft, but no more than one floor
    2. Occupancy Sensor with a minimum of 30 minute timer
    3. Signal from another control/alarm system to indicate the area is unoccupied

Chapter 9 Lighting



1. Definition of Alterations
    1. 2004 – Less than 50% replacement had exemption
    2. 2010 – decreased to less than 10% replacement for an exemption
        1. Cannot increase space/area LPD

2. Mandatory Provisions
    1. Automatic control device on functionality
        1. Manual On
        2. 50% or less of lighting power Auto On
    2. Space Control
        1. Step Control between 30% and 70% of full lighting power in addition to off
        2. Occupancy Sensor or Timer switch with maximum unoccupied time of 30 minutes
    3. Automatic Daylighting Controls (Now Required)
        1. Required for luminaires in defined Side and Top lighting zones
        2. Requires Automatic multilevel photocontrol between 50%-70%, additionally less than 35% (including off for Side Lighting Only)

TABLE 9.5.1 Lighting Power Densities Using the Building Area Method

Building Area Type[a]	*LPD* (W/ft^2)
Automotive facility	0.82
Convention center	1.08
Courthouse	1.05
Dining: bar lounge/leisure	0.99
Dining: cafeteria/fast food	0.90
Dining: family	0.89
Dormitory	0.61
Exercise center	0.88
Fire station	0.71
Gymnasium	1.00
Health-care clinic	0.87
Hospital	1.21
Hotel	1.00
Library	1.18
Manufacturing facility	1.11
Motel	0.88
Motion picture theater	0.83
Multifamily	0.60
Museum	1.06
Office	0.90
Parking garage	0.25
Penitentiary	0.97
Performing arts theater	1.39
Police station	0.96
Post office	0.87
Religious building	1.05
Retail	1.40
School/university	0.99
Sports arena	0.78
Town hall	0.92
Transportation	0.77
Warehouse	0.66
Workshop	1.20

[a] In cases where both a general building area type and a specific building area type are listed, the specific building area type shall apply.

Chapter 9 Lighting

1. Exterior Updates
    1. Requirement to be shutoff with sufficient daylight
        1. 2004 – capability only required
    2. Façade and Landscape lighting auto off between Midnight/Closing and 6AM/Opening
2. Functional Commissioning/Testing
    1. Now REQUIRED
    2. Confirm placement and Sensitivity of Occupancy Sensors
    3. Confirm time switches and programmable schedules function to turn lights off
    4. Confirm photocontrol sensors to reduce artificial lighting level based on usable daylight in defined areas
3. LPD Allowances
    1. Average of 10% less allowable light (Schools 17.5% less allowed)
    2. 5-10% additional LPD allowed for controlled areas

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Questions and Comments?

Misc.

WHAT IS A DAYLIGHT ZONE?

IECC 2009 ...

Area adjacent to sidelighting:

daylight zone = depth x width
depth = the LESSER value of:
15 ft. OR
distance from vertical fenestration and nearest opaque ceiling-height partition
width = the LOWEST value of:
width of window + 2 ft. on each side OR
width of window + distance to opaque partition OR
width of window + (1/2 distance to adjacent skylight or vertical fenestration)

Area under skylights:

daylight zone = L x W
L = the LOWEST value of:
(length of skylight) + (distance floor to ceiling) OR
(length of skylight) + (distance to nearest opaque ceiling-height partition) OR
1/2 the distance between the skylight and an adjacent skylight or window
W = same as sidelighting above

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Primary sidelighted area:

Daylight zone = depth x width
Depth = the LESSER value of:
Distance from floor to top of window OR
Distance on the floor, perpendicular to the glazing, to nearest 60+ inch high permanent partition
Width = the LESSER value of:
width of window + 2 ft. on each side OR
width of window + distance to 60+ inch high vertical obstruction

Secondary sidelighted area:

Begins at the edge of the primary sidelighted area and ends at the LESSER of:
one window head height (equal to distance between floor and top of glazing) OR
distance to any 60+ inch vertical obstruction

Area under skylights:

daylight zone = L x W (with no double counting of overlapping areas)
L = (length of skylight) + the LOWEST value of:
70% of the ceiling height OR
distance to any primary sidelighted area or daylight area under rooftop monitors OR
distance to the front face of any vertical obstruction where any part of the obstruction is farther away than 0.7 x (ceiling height – obstruction height)

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